## REMARKS

**Status of the Claims**

Claims 1-12 are presented for examination.

Claim 1 has been amended to more clearly define the invention as disclosed at paragraph [00010] of the specification. New independent claim 13 has been added to explicitly recite that the press-hardening of the trimmed part blank (17) in a hot-forming tool (23) involves cooling, as discussed in detail in paragraph [00039]. No new matter is introduced by this amendment.

**Present Invention**

It is known to press-form a soft sheet blank and then harden the three dimensional shape, but trimming the hardened part in a dimensionally accurate manner requires expensive equipment and results in burrs which may lead to rapid crack formation. Alternative cutting methods (laser cutting or water-jet cutting) work comparatively slowly.

The prior art cited by the examiner avoids the above problem by trimming the margins from the soft (unhardened) shaped part, and then heat treating. However, heat treating a shaped part results in deformations.

According to the invention:

- the sheet blank is formed to near net shape in a cold forming process,
- the marginal regions are trimmed off,
- the trimmed part is heated (to a temperature above the structural transformation temperature in the austenitic state – claim 13); and
- the heated part is subject to a final shaping and rapid cooling in a hot-forming tool to set the material structure.

Since the part is first formed in a cold forming process, the part can be subject to greater deformation than possible with press-hardening (heating followed by deformation in a hot-forming tool). Since the trimmed part already has dimensions near net shape, only a slight adaptation of shape is necessary during the hot forming. In the hot-forming tool the trimmed part is finish-shaped and rapidly cooled (e.g., the hot forming tool is cooled with brine), as a result of which a fine-grained martensitic or bainitic material structure is set, and high

dimensional accuracy is achieved. Due to the fact that the near net shape part is trimmed preceding the hot-forming process and on account of the adaptation of shape of the outer margin in the hot-forming tool, the part already has the desired outer contour after completion of the hot-forming process, so that no time-consuming trimming of the part margin is necessary after the hot forming.

**Information Disclosure Statement**

The Examiner has initialled form PTO-1449 with respect to Documents 1-11, patents and patent applications. However, the Examiner has crossed through non-patent documents.

The Examiner indicates that non-patent literature listed in last page of IDS marked 08/27/2007, were not considered because no corresponding English translation / abstracts were provided. 37 CFR 1.98(a)(2) requires a legible copy of: … (4) all other information, or that portion which caused it to be listed. In addition, each IDS must include a list of all … other information submitted for consideration by the Office (see 37 CFR 1.98(a)(1) and (b)), and MPEP § 609.04(a), subsection I. states, "the list ... must be submitted on a separate paper."

In response, Applicant submits that

(1) these references were brought to the attention of the Examiner out of an abundance of precaution,

(2) a separate listing of these documents was provided,

(3) an explanation of relevancy of these documents was provided

(4) Applicants consider these documents to be confidential and thus consider them to be non-publications,

(5) accordingly, nothing further is required.

**Claim Rejections - 35 USC § 102**

Claim 1, 6, 10-11 are rejected as being anticipated by Tjoelker et al (US 6,918,224 B2).

Applicants respectfully traverse.

Very basically, Tjoelker et al teach cold forming followed by induction heating, a process that does not assure dimensional accuracy of the part. Tjoelker et al do not teach press hardening in a hot forming tool, and thus can not teach or suggest the advantages associated with the

present inventive combination (a) cold forming to a near net shape followed by (b) press-hardening in a hot forming tool.

More specifically, the present invention addresses the problem of how to provide a dimensionally true, hardened shaped part by a simplified and economical process.

As discussed in the present specification, it is known to press-form a soft sheet blank, and then to harden the three dimensional formed shape. However, trimming the margins from the hardened shape in a dimensionally accurate manner requires expensive equipment and results in burrs which may lead to rapid crack formation. Alternative cutting methods (laser cutting or water-jet cutting) work comparatively slowly.

As correctly pointed out by the Examiner, Tjoelker et al avoids the above problem by trimming the margins from the soft (unhardened) shaped part prior to heat treating.

However, this approach leads to a different problem – heat treating a shaped part results in thermal warpage of the part, thus this process can only be used where high dimensional accuracy is not required.

In contrast, according to the present invention:

- the sheet blank is formed to near net shape in a cold forming process,
- the marginal regions are trimmed off the still soft near net shape part,
- the trimmed part is heated (to a temperature above the structural transformation temperature in the austenitic state – claim 13); and
- the heated part is subject to a final shaping and rapid cooling in a hot-forming tool to set the material structure. (inherent in claim 1 and explicitly recited in claim 13)

Since the part is shaped in a cold forming process, more complex geometries can be formed in comparison to hot-forming (specification paragraph [00015]). Further, multiple passes can be made in cold forming, thus greater deformation can take place than with conventional hot forming (specification paragraph [00015]). Since the trimmed part already has dimensions near net shape, only a slight adaptation of shape is necessary during the hot forming, and thus wear on the hot-forming tool is reduced, saving costs (specification paragraph [00013]). In the hot-forming tool the trimmed part is finish-shaped and rapidly cooled (e.g., the hot forming tool is cooled with brine), as a result of which a fine-grained martensitic or bainitic material structure is set, and high dimensional accuracy is achieved. Due to the fact that the near net shape part is trimmed preceding the hot-forming process and on account of the adaptation of shape of the

outer margin in the hot-forming tool, the part already has the desired outer contour after completion of the hot-forming process, so that no time-consuming trimming of the part margin is necessary after the hot forming.

Turning now to the rejection, according to the Examiner, with respect to claims 1 and 11, Tjoelker et al teaches a process for forming a vehicle component comprising the steps of

- cold forming unhardened steel into a workpiece having mounting surfaces;
- selectively fixturing the mounting surfaces;
- static induction heating the workpiece with lengthwise surface eddy currents on selected portions; followed by
- quenching of the fixtured heated workpiece to form strengthened portions; and
- unfixturing the resulting components.

Tjoelker et al merely teach cold forming followed by heat treating. Tjoelker et al shows in Fig. 4-6 and associated text (col. 4 lie 27- col. 5, line 20) that during the heat treatment the working piece is only clamped at its end portions. This method does not allow for high dimensional accuracy of the heat-treated part.

Further, at col. 1, line 35, Tjoelker et al in fact teaches disadvantages associated with hot forming, and teaches overcoming these disadvantages by avoiding hot forming. In fact, considering the part shown in Tjoelker et al, it is not possible to press-harden this whole workpiece, but only the central portion of the beam. Thus, Tjoelker et al teaches against the present invention which requires a combination (a) cold forming to a near net shape followed by (b) press-hardening in a hot forming tool.

In conclusion, as Tjoelker et al does not teach all limitations of the present claims, withdrawal of the rejection is respectfully requested.

**Claim Rejections - 35 USC § 103**

Claims 2-4, 12 are rejected under 35 U.S.C. §103(a) as being obvious over Tjoelker et al, as applied on claim 1, and further in view of term definition for "stamping" on Wikipedia (www.wikipedia.org).

As pointed out by the Examiner, Tjoelker et al teaches the workpiece is forcefully cold formed at substantially ambient temperature from non-hardened steel, such as by stamping and/or rolling techniques of conventional type, into the desired configuration (Col.4, lines

14-25 of Tjoelker et al). The term definition for "Stamping" in Wikipedia is: "Stamping is a metalworking process by which sheet metal strips are punched using a press tool which is loaded on a machine press or stamping press to form the sheet into a desired shape and the most common stamping operation are: piercing; fine blanking; bending; forming; coining; progressive stamping; deep drawing; embossing; and extrusion". Because stamping includes drawing (or deep drawing) method as recited in the instant claims, therefore, it would have been obvious to one skilled in the art to choose drawing (as claimed in the instant claim 12) or deep drawing (as claimed in the instant claim 2) to cold forming the workpiece because Tjoelker et al discloses the same utility throughout the disclosed stamping. Because stamping also includes extrusion technique, which is also known as a mechanical cutting (or trimming) method, therefore, it would have been obvious to one skilled in the art to choose trimming technique for cold forming as recited in the instant claims 3-4 in the process of Tjoelker et al in order to obtain the desired configuration (Col.4, lines 14-25 of Tjoelker et al).

In response, Applicants point out, as explained in detail above, the present invention requires the combination of (a) cold forming to a near net shape followed by (b) press-hardening in a hot forming tool.

As discussed above, while Tjoelker et al teach cold forming, Tjoelker et al teach against hot press forming.

Wikipedia disclosure of drawing or deep drawing as forms of cold forming does not come any closer to the present invention since there remains an absence of teaching of hot press forming.

According to the present invention, the sheet blank is formed to near net shape in a cold forming process, with trimming prior to heat treatment, and then heating and a final shaping and rapid cooling in a hot-forming tool to set the material structure.

Since the part is shaped in a cold forming process, more complex geometries can be formed in comparison to hot-forming (specification paragraph [00015]). Further, multiple passes can be made in cold forming, thus greater deformation can take place than with conventional hot forming (specification paragraph [00015]). Since the trimmed part already has dimensions near net shape, only a slight adaptation of shape is necessary during the hot forming, and thus wear on the hot-forming tool is reduced, saving costs (specification paragraph [00013]). In the hot-forming tool the trimmed part is finish-shaped and rapidly cooled (e.g., the hot forming tool is

cooled with brine), as a result of which a fine-grained martensitic or bainitic material structure is set, and high dimensional accuracy is achieved. Due to the fact that the near net shape part is trimmed preceding the hot-forming process and on account of the adaptation of shape of the outer margin in the hot-forming tool, the part already has the desired outer contour after completion of the hot-forming process, so that no time-consuming trimming of the part margin is necessary after the hot forming.

Accordingly, withdrawal of the rejection is respectfully requested.

Claims 5, 7-9, are rejected under 35 U.S.C. §103(a) as being unpatentable over Tjoelker et al as applied on claim 1, and further in view of Bronsema et al (US 5,669,992).

Applicants respectfully traverse.

Applicants first point out that Bronsema et al nowhere teaches hot press forming as required in present claims 1 and 13, thus this combination of references does not come close to the present invention.

According to the Examiner, regarding claim 5, Tjoelker et al teaches using induction heat to treat the steel and quenching in quench tank unit to obtain desired hardening effect (Col.5, lines 9-20 of US'224). Applicants point out that this is not hot press forming.

The Examiner concedes that Tjoelker et al do not specify being cooled with brine. However, it is within the ordinary skill in the art to choose different quenching solutions for getting desired hardening effect, which is evidenced by Bronsema et al.

In response, Applicants point out that brine is claimed as the heat transfer (removal) medium for cooling a hot-forming tool. Since the cited references do not teach use of a hot forming tool for press hardening, the refernces can not suggest the present invention.

Bronsema et al is next cited for teaching a method for manufacturing an automobile bumper beam (Col.1, lines 4-7 of Bronsema et al). Bronsema et al teaches induction hardening method (Col.3, lines 25-46 of Bronsema et al 2). Bronsema et al teaches using water solution containing various salts as quenching solution. Therefore, it would have been obvious to one skilled in the art to choose brine as a quenching solution as recited in the instant claim in the process of US'224 in order to obtain desired hardening effect as demonstrated in Bronsema et al.

In response, Applicants again point out that present invention is based on superior results obtained by the combination of (a) cold forming to a near net shape followed by (b) press-

hardening in a hot forming tool. Since the cited references do not teach use of a hot forming tool for press hardening, the refernces can not suggest the present invention.

Regarding claims 7 and 8, Bronsema et al is cited for teaching: "The atmosphere chamber exposes the steel S to only inert gas during these functions to prevent oxidation and the formation of scales on the steel surface so that the bumper beam can be later painted, if desired." (Col.3, lines 30-34 of Bronsema et al).

In response, Applicants again point out that present invention is based on superior results obtained by the combination of (a) cold forming to a near net shape followed by (b) press-hardening in a hot forming tool, which is nowhere taught in the combination of references.

Regarding claim 9, Tjoelker et al is cited for teaching using induction heat to treat the steel (Fig. 1-5 and Col.4, line 53 to col.5, line 20 of Tjoelker et al), Bronsema et al teaches induction heating furnace and Bronsema et al teaches the bumper beam is treated continuously (Fig.1-3 and Col.3, lines 25-47 of Bronsema et al). Therefore, it reads on the claimed features.

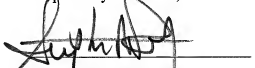
In response, Applicants again point out that present invention requires the combination of (a) cold forming to a near net shape followed by (b) press-hardening in a hot forming tool. No combination of teaching from these references leads one to expect the benefits obtained by the present invention.

Accordingly, withdrawal of the rejection and early issuance of the Notice of Allowance are respectfully requestd.

requested. **Should further issues remain prior to allowance, the Examiner is respectfully requested to contact the undersigned at the indicated telephone number.**

The Commissioner is hereby authorized to charge any fees which may be required at any time during the prosecution of this application without specific authorization, or credit any overpayment, to Deposit Account Number 16-0877.

Respectfully submitted,



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